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August 16, 2013

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BY ECFS

Ms. Marlene Dortch
Secretary
Federal Communications Commission
445 12th Street S.W.
Washington, DC 20554

Re: In the Matter of Expanding the Economic and Innovation Opportunities of
Spectrum Through Incentive Auctions, GN Docket No. 12-268
NOTICE OF ORAL EX PARTE PRESENTATION

Dear Ms. Dortch:

On Wednesday, August 14, 2013, Preston Padden, Executive Director of the Expanding Opportunities for Broadcasters Coalition (the "Coalition"), Jeff Eisenach of Navigant Consulting, and Ari Meltzer of Wiley Rein LLP, on behalf of the Coalition, met separately with: (1) Sarah Whitesell and Louis Peraetz of the Office of Chairwoman Mignon Clyburn;¹ (2) David Goldman of the Office of Commissioner Jessica Rosenworcel; (3) Matthew Berry, Nicholas Degani, and Courtney Reinhard of the Office of Commissioner Ajit Pai; and (4) Gary Epstein and Edward Smith of the Incentive Auction Task Force ("Task Force"), Evan Kwerel of the Office of Special Projects and Wireless Telecommunications Bureau, Sasha Javid, John Leibovitz, Patricia Robbins, Brett Tarnutzer, and Margaret Weiner of the Wireless Telecommunications Bureau, Rebecca Hanson of the Media Bureau, and Julius Knapp and Renee Gregory of the Office of Engineering and Technology.

During each of these meetings, the Coalition representatives presented their understanding, based on the Notice of Proposed Rulemaking, public notices, and other public statements by FCC Staff, of the mechanics of the proposed integrated auction proposal. The Coalition representatives explained that a descending clock auction, by its design, will prioritize stations that are more valuable to the goal of spectrum reallocation by "freezing" those stations at a higher price when they cannot be repacked. Meanwhile, stations that are of less value because they can more easily be repacked will fall to later rounds of the auction, and thus receive a lower payment (if any at all). As a result of this operation, stations will be

¹ Richard Bodorff of Wiley Rein LLP also participated in this meeting.



Ms. Marlene Dortch

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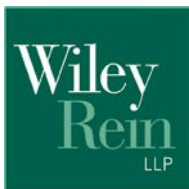
compensated based on their relative value in repacking. The Coalition representatives further described how any additional “scoring” could produce sub-optimal results by either: (1) discouraging some television stations from participating in the auction at all; or (2) causing “scored” stations to withdraw prematurely, forcing the Commission to pay more to clear the same amount of spectrum.

The Coalition representatives also urged the Commission not to abandon the goal first established in the National Broadband Plan of reallocating 120 MHz of television broadcast spectrum for mobile broadband use. They explained that the 120 MHz of television broadcast spectrum is critical to reaching the total reallocation goal 500 MHz. Additionally, the Coalition representatives explained that the 120 MHz goal is attainable, describing the successful efforts by a Coalition member to model a repacking of Los Angeles and neighboring markets (based on proprietary market information) that would permit the reallocation of 120 MHz for wireless broadband. The Coalition continues to study additional markets to confirm the feasibility of reallocating 120 MHz in those markets. The Coalition representatives also highlighted a recent Citi Research report, which recognized that “[i]n today’s world of asymmetric data traffic, companies and investors should ascribe much greater value to downlink spectrum,”² which provides further support for committing to a goal of reallocating 120 MHz.

Finally, the Coalition representatives stressed that the Commission should not adopt any restrictions on auction participation that will reduce forward auction revenues, and noted that reallocating 120 MHz of spectrum is the best solution to encourage competition.

Pursuant to Section 1.1206 of the Commission’s rules, attached hereto is a copy of the written presentations that were provided to the FCC representatives during each meeting.

² See Citi Research, Breaking Symmetry 3 (Aug. 8, 2013).



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Respectfully Submitted,

A handwritten signature in blue ink, appearing to read "Ari Meltzer".

Ari Meltzer
Counsel to the Expanding Opportunities for Broadcasters Coalition

cc (via e-mail):

Matthew Berry
Gary Epstein
Nicholas Degani
David Goldman
Renee Gregory
Rebecca Hanson
Sasha Javid
Julius Knapp
Evan Kwerel
John Leibovitz
Louis Peraetz
Courtney Reinhard
Patricia Robbins
Edward Smith
Brett Tarnutzer
Margaret Weiner
Sarah Whitesell



August 14, 2013 Presentation

- **“Scoring”**
 - The likely auction design automatically will pay higher prices to TV Stations that contribute the most to clearing/repacking spectrum and lower prices to TV Stations that are easier to repack and contribute less to clearing spectrum.
 - Therefore, any ex ante “scoring” scheme would be duplicative, unnecessary and unwarranted.
- **120 MHz**
 - The FCC’s goal should be to reallocate 120 MHz from TV broadcasting to wireless broadband in 2014.
 - Cisco estimates that by 2017, monthly mobile data traffic will reach 11.2 exabytes per month, or 13 times what it is right now.
 - Of the 500 MHz reallocation goal in the National Broadband Plan, the 120 MHz from TV broadcasting is the cleanest and the “most real”.
 - It would make no sense to leave any of this highly desirable spectrum “on the table”.
 - A Coalition Member with knowledge of Los Angeles broadcasters has modeled a successful 120 MHz auction there at realistic prices including a repack of LA and adjacent markets.
 - The Coalition will share the results of auction models in other markets as they become available.
 - Both paired blocks and supplemental downlinks have tremendous value.
 - Securing 120 MHz will raise the most money and help to assure that there will be spectrum for all carriers.

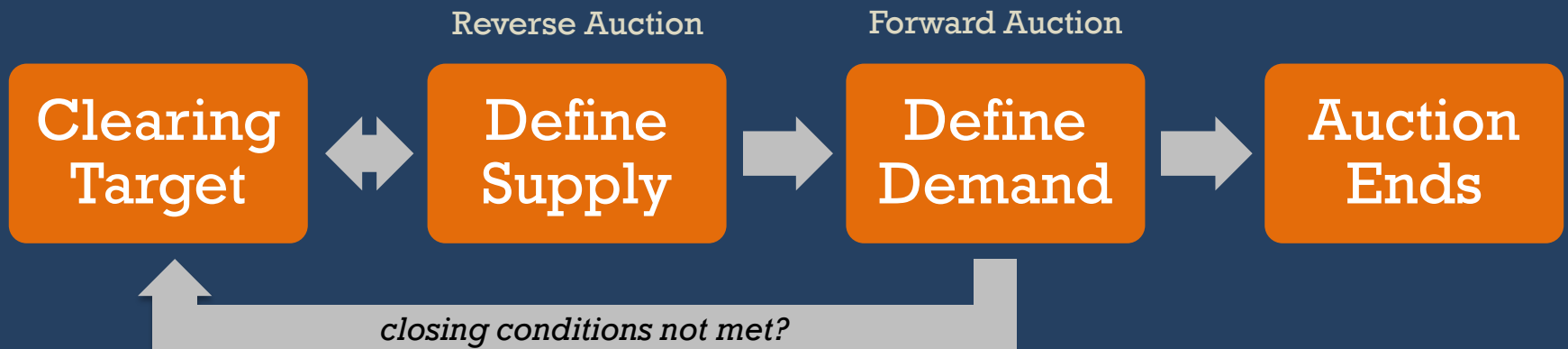
Expanding Opportunities for Broadcasters Coalition

Putting it all together—implementing the
FCC's integrated auction proposal.

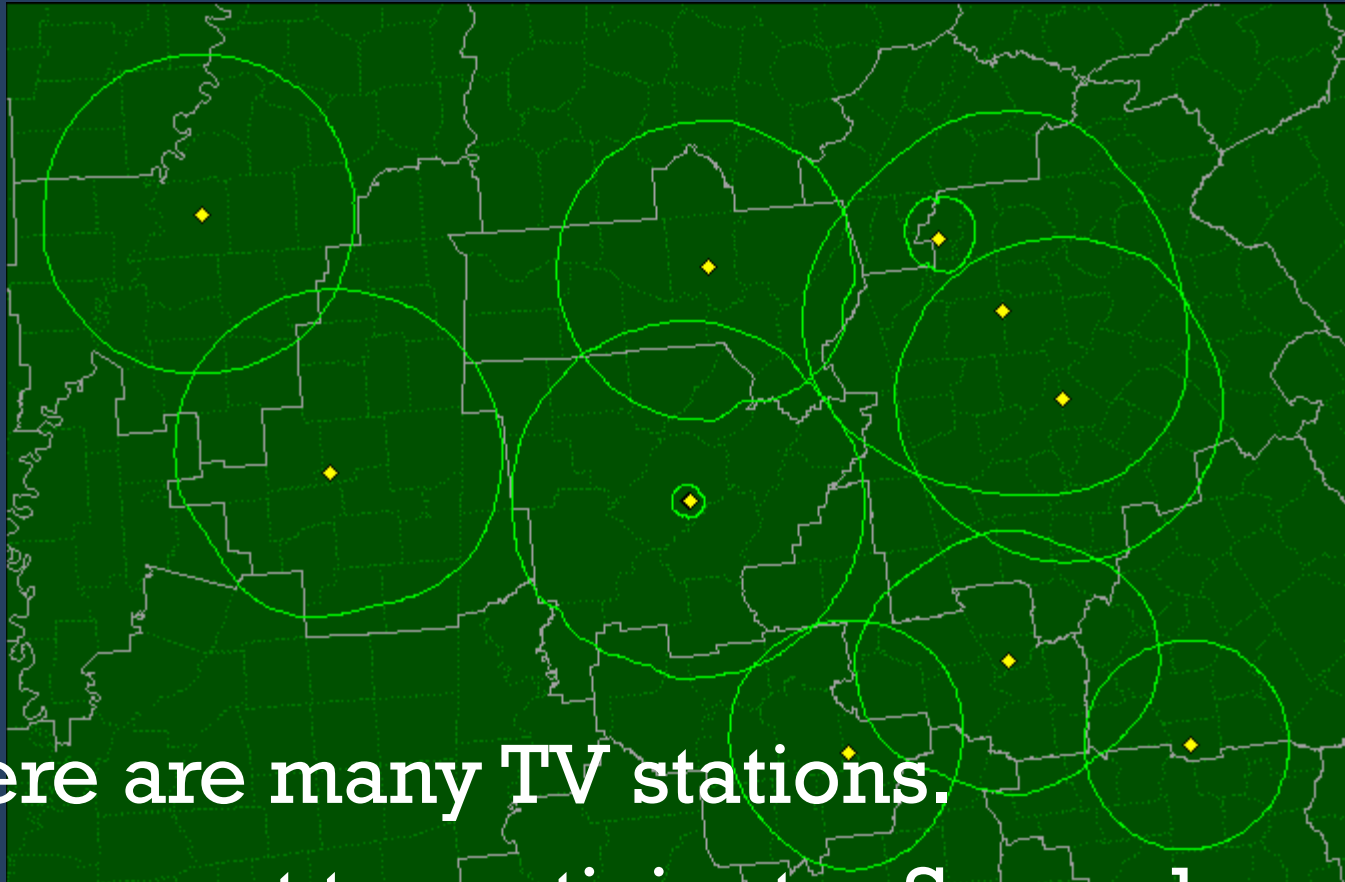
Putting It All Together

- The FCC has not yet made any decisions regarding auction design.
- The FCC has a number of proposals for auction design in its NPRM.
- This presentation describes one way of implementing the Integrated Auction Proposal that ties together the NPRM and subsequent FCC releases.

Macro Design



Defining Supply



There are many TV stations.

Some want to participate. Some do not.

Ideal Auction Design

Optimize decisions to purchase the right stations...

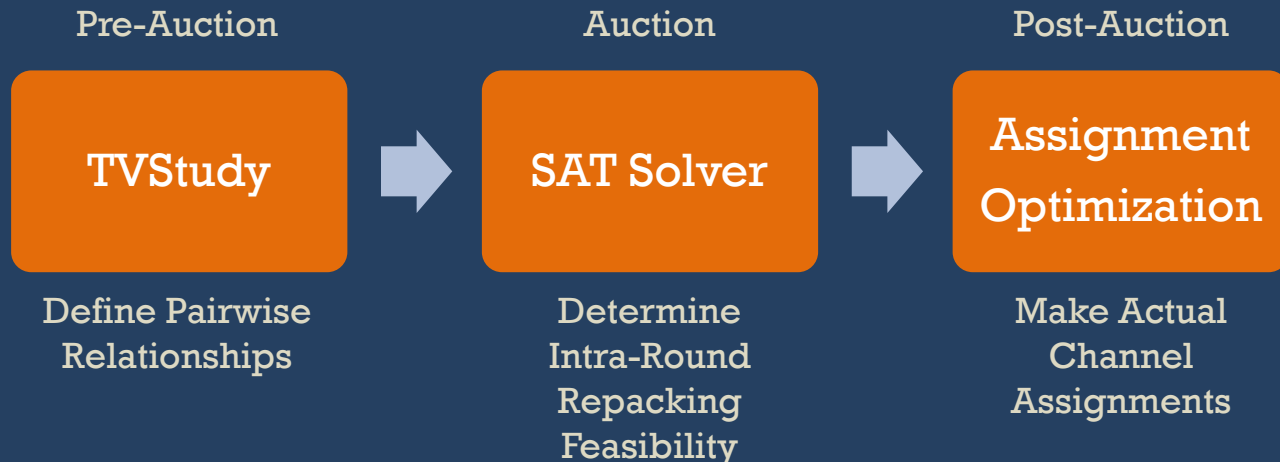
...at the right price.

But the FCC doesn't have unlimited time & computing resources.

Real World Auction Design

Selectively apply computational resources

- Do “hard” things pre- and post-auction
- Limit intra-round computation



Pre-Auction Computation

TVStudy (OET69)—a complex way of to get a simple answer to one question...

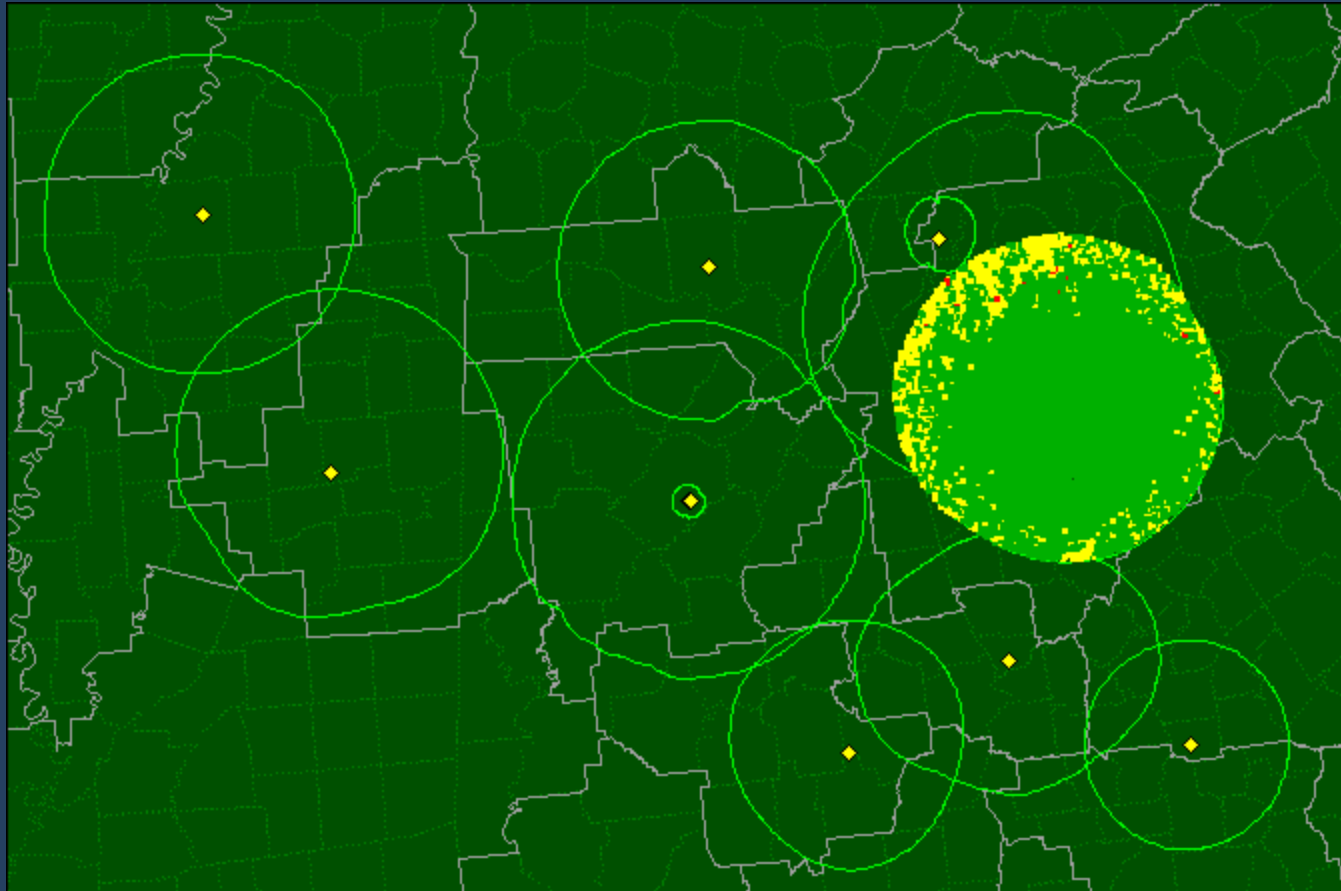
“Is Station A compatible with Station B?”

Pre-Auction Computation

TVStudy (OET69)—a complex way of to get a simple answer to one question...

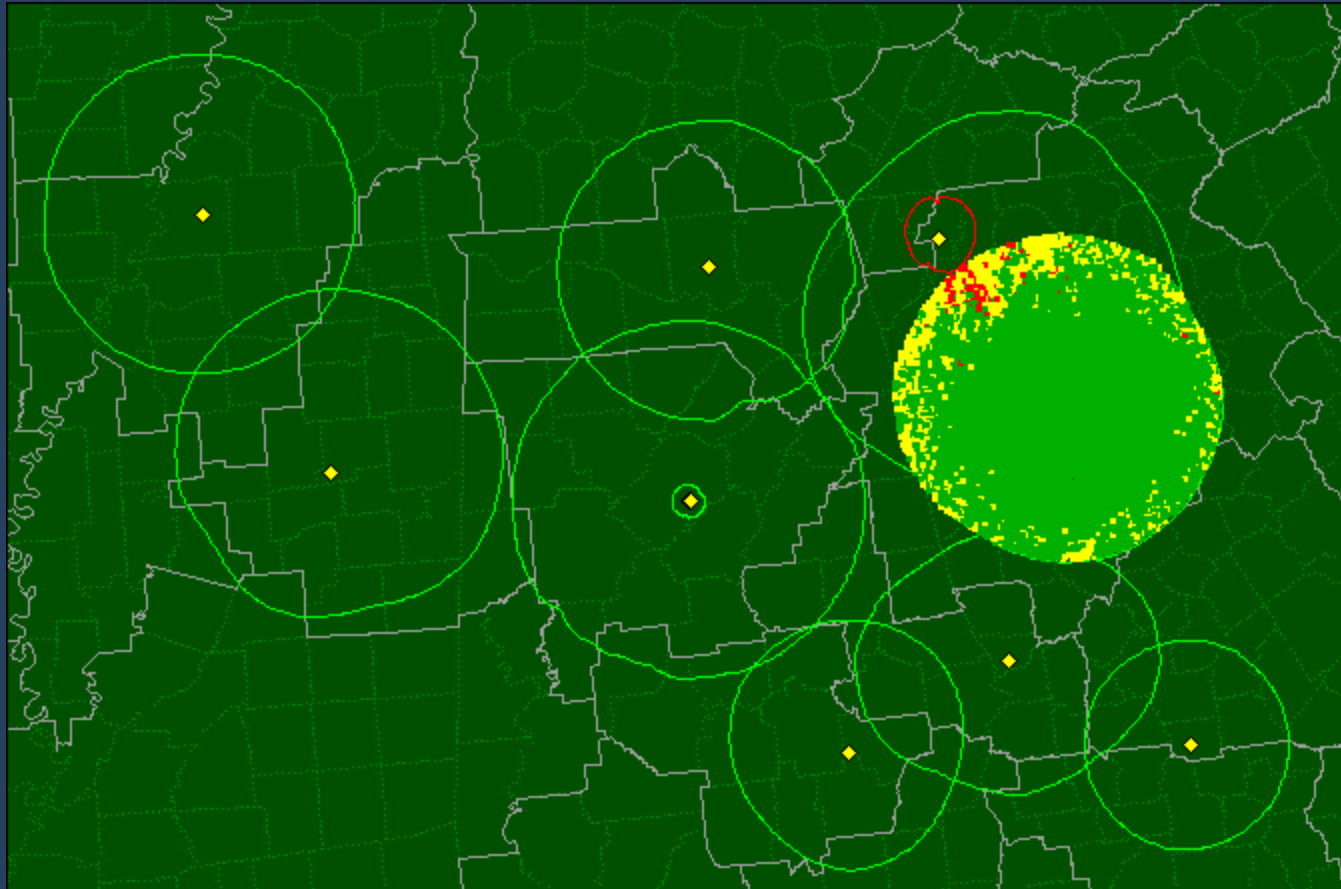
“Is Station A compatible with Station B?”*

TVStudy



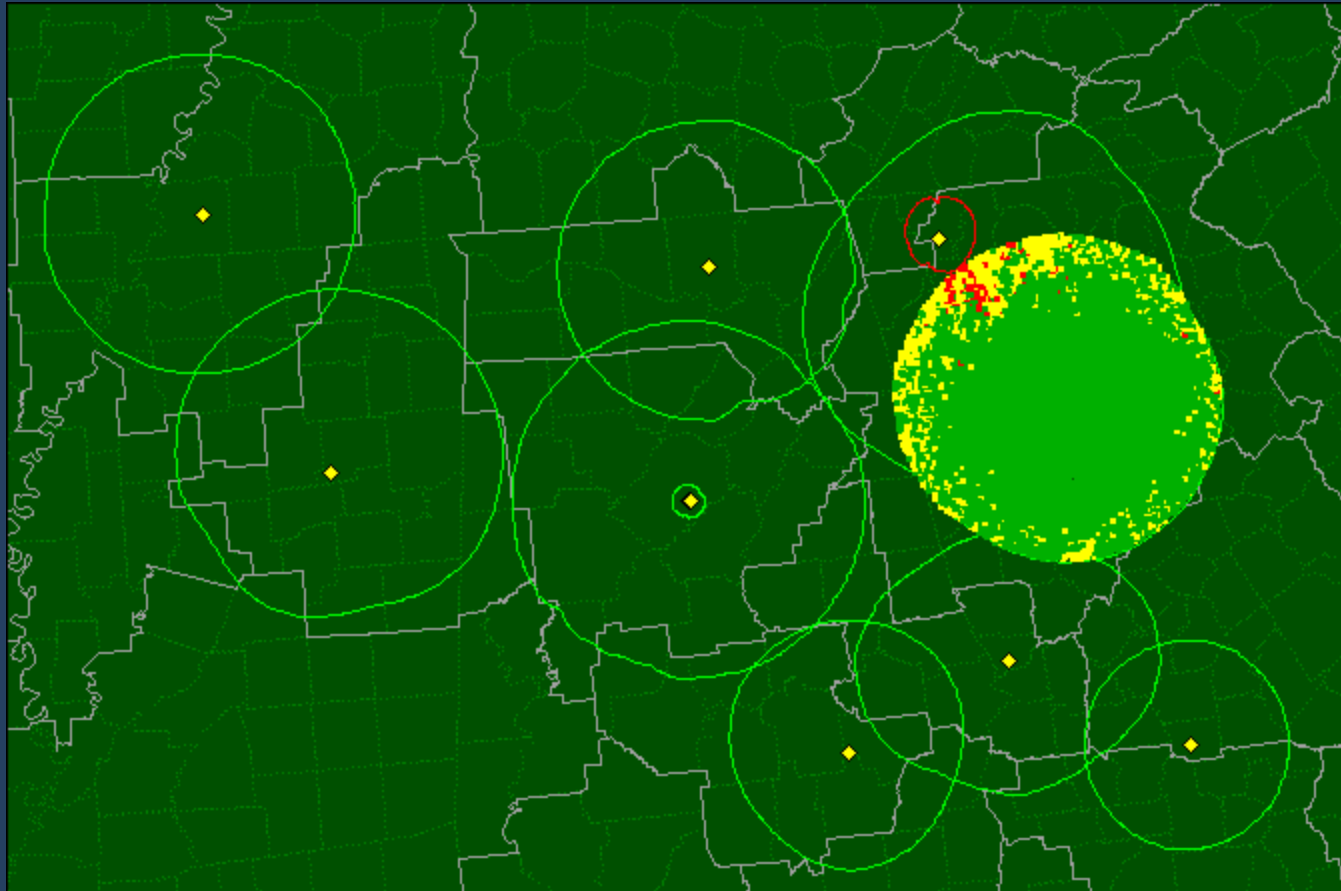
Baseline case for a station...

TVStudy



Assess pairwise interference...

TVStudy



Repeat 58,291,391 times

*It is more complex

If Station A is on Channel 20, can Station B be co-channel? Upper adjacent? Lower adjacent?

- Channel 20 is a proxy; the process will not be repeated for 14, 15, 16...
- Because of propagation differences, you do need another proxy for low VHF (2-4), mid VHF (5-6) and high VHF (7-13).

(It isn't *that* bad. The FCC knows LA stations don't affect NY stations.)

*It is more complex

You can think of this as a large table:

		A			B		
		Below	Same	Above	Below	Same	Above
A	Low VHF				Y	N	Y
	Mid VHF	-	-	-	Y	N	Y
	High VHF	-	-	-	Y	N	Y
	UHF	-	-	-	Y	Y	Y
B	Low VHF	Y	N	Y			
	Mid VHF	Y	N	Y	-	-	-
	High VHF	Y	N	Y	-	-	-
	UHF	Y	Y	Y	-	-	-

***It is more complex**

Or a large “Boolean” table:

		A			B		
		Below	Same	Above	Below	Same	Above
A	Low VHF				True	False	True
	Mid VHF	-	-	-	True	False	True
	High VHF	-	-	-	True	False	True
	UHF	-	-	-	True	True	True
B	Low VHF	True	False	True			
	Mid VHF	True	False	True	-	-	-
	High VHF	True	False	True	-	-	-
	UHF	True	True	True	-	-	-

Fast Intraround Computation

The design checks repacking feasibility

“Does at least one solution exist?”

Feasibility is different than **optimization**

“What is the best solution”?

The feasibility problem is a “Boolean Satisfiability Problem” or “SAT Problem”

(Optimization is an Integer Linear Programming—ILP—problem)

Framing the SAT Problem

For a given set of television stations and channels, is there a repacking solution where:

- Station A cannot be on channel 42 and
- Stations A and B cannot both be on the same channel and
- Station C cannot be on a channel adjacent to Station A and...

The SAT Constraint

Is there a channel mapping such that:

$(\text{not}(A=42))$ and

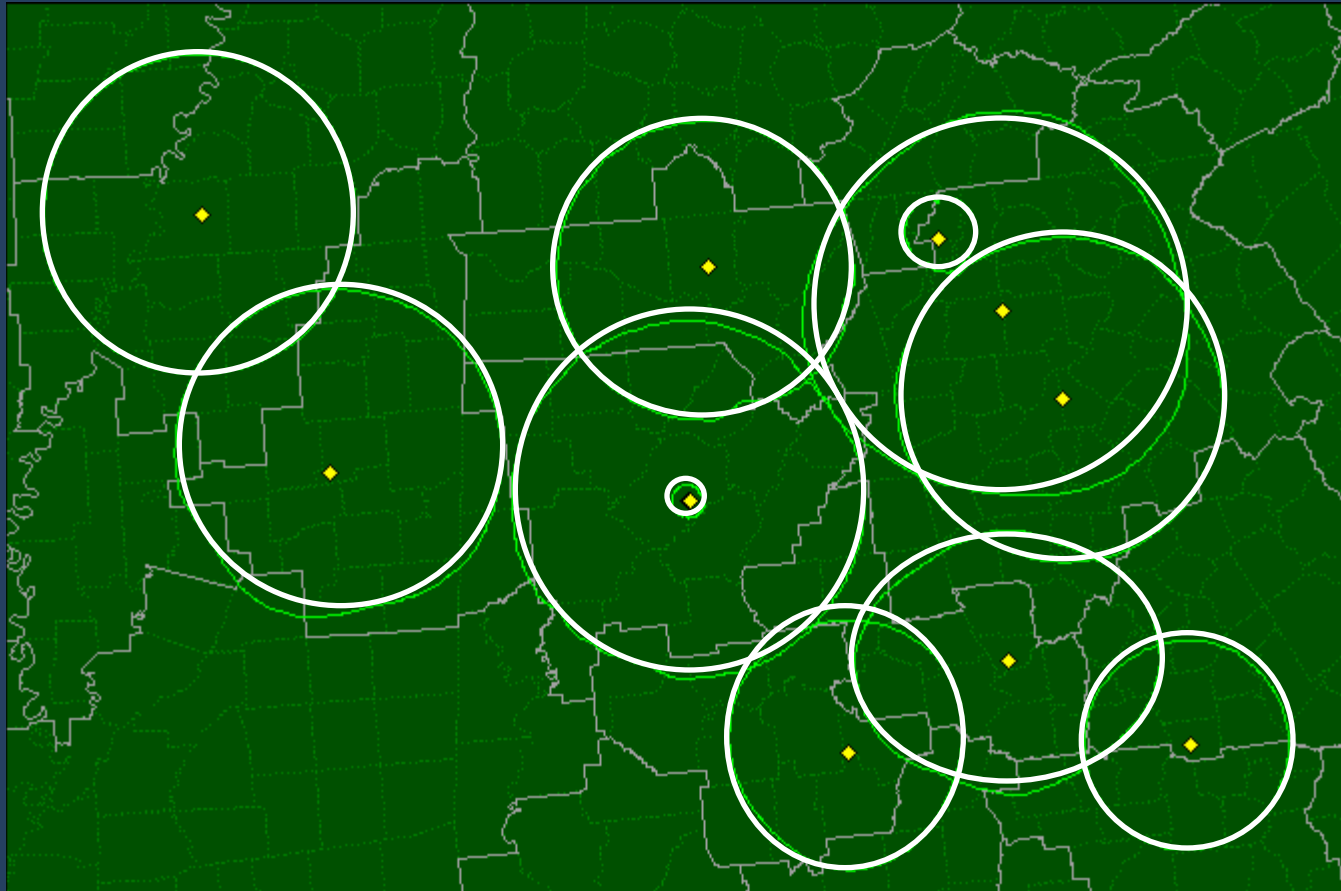
$(\text{not}(A=B))$ and

$(\text{not}((A=C+1) \text{ or } (A=C-1)))$ and...

...is TRUE

Even with tens of thousands of clauses,
optimized SAT Solvers can answer in
seconds.

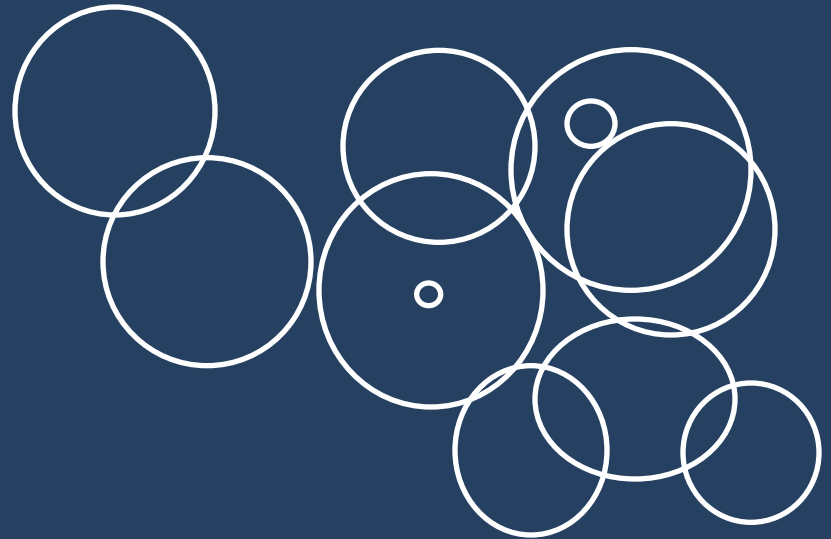
How does it work?



How does it work?

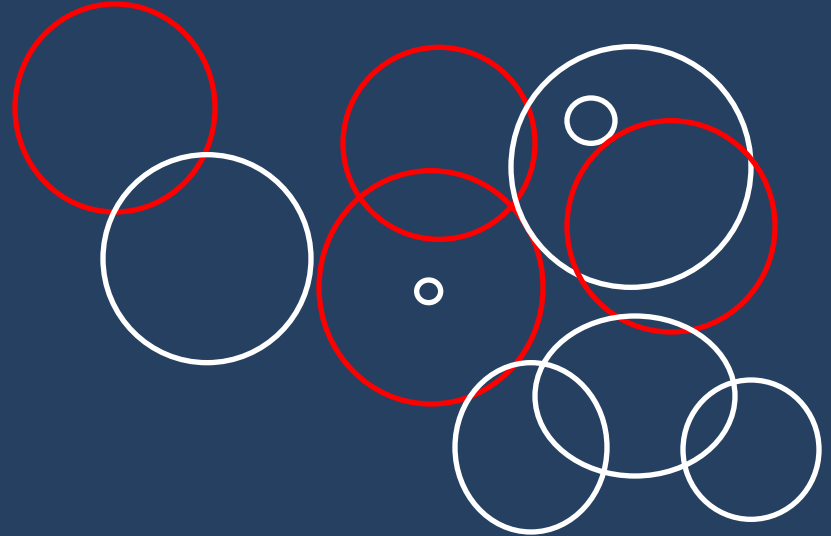
The FCC makes an offer to each station.

If the prices are sufficiently high, all may accept.



First Refusals

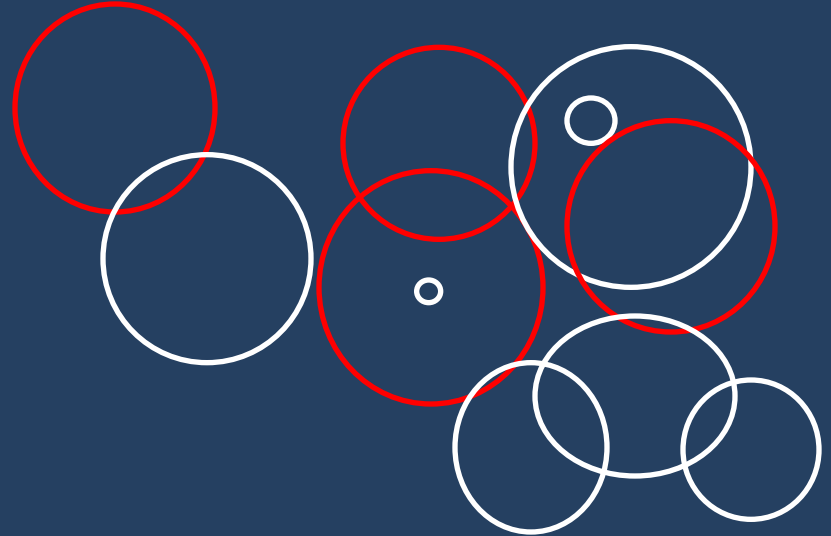
Ultimately, there are stations (**red**) that will decline the FCC's lower offers and must be repacked.



First Refusals

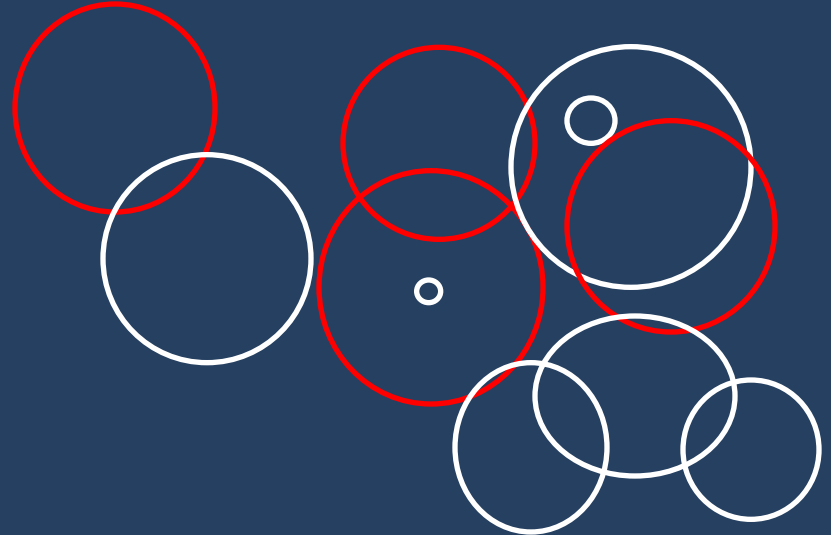
Run a feasibility check to see if opt-outs can be repacked and meet clearing target.

Assume they can.



First Refusals

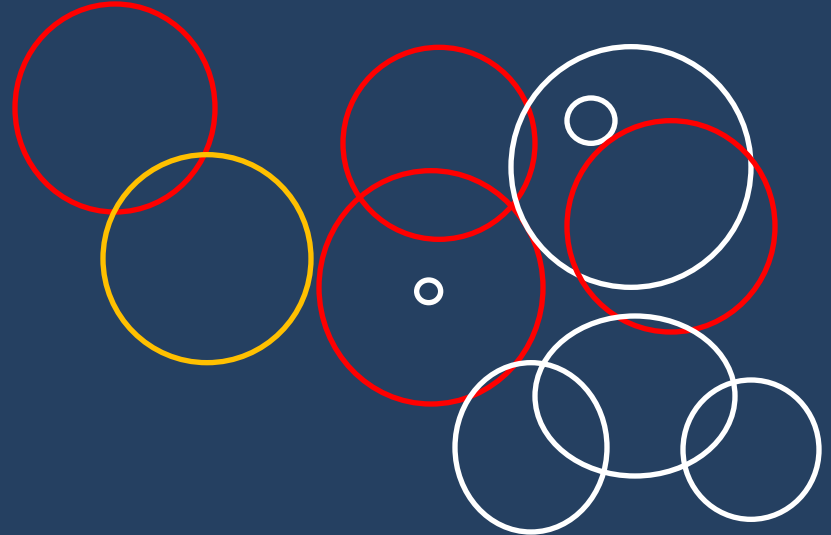
Now run a series of
feasibility checks...



First Refusals

Now run a series of
feasibility checks...

...can **each** station
be repacked with
the red stations?

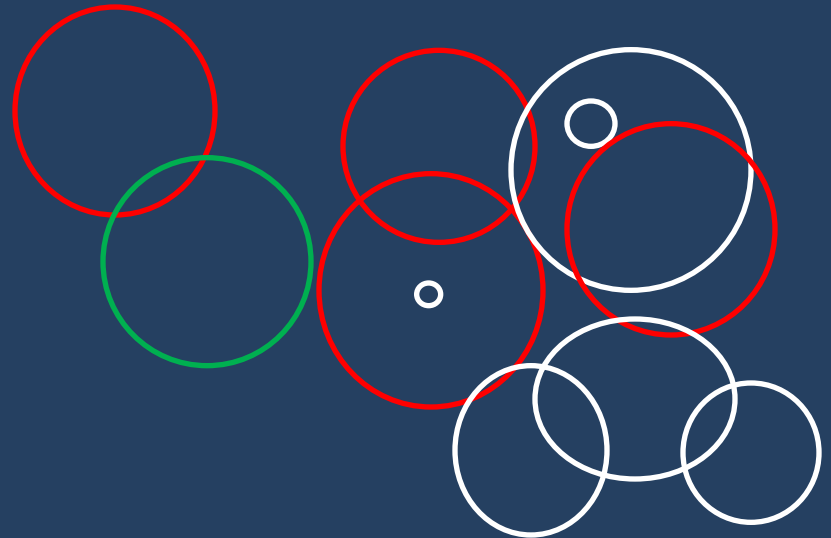


First Refusals

Now run a series of feasibility checks...

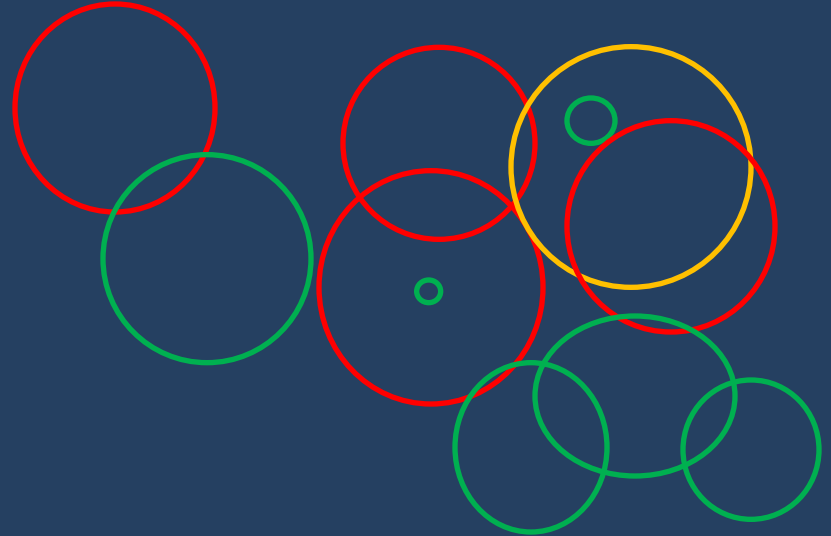
...can **each** station be repacked with the red stations?

Say this one can be.



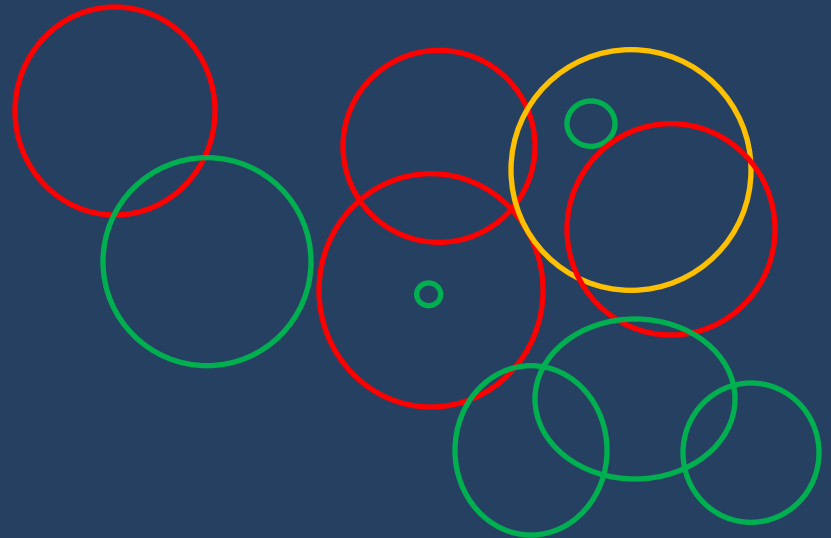
First Refusals

Now check all the
other stations.



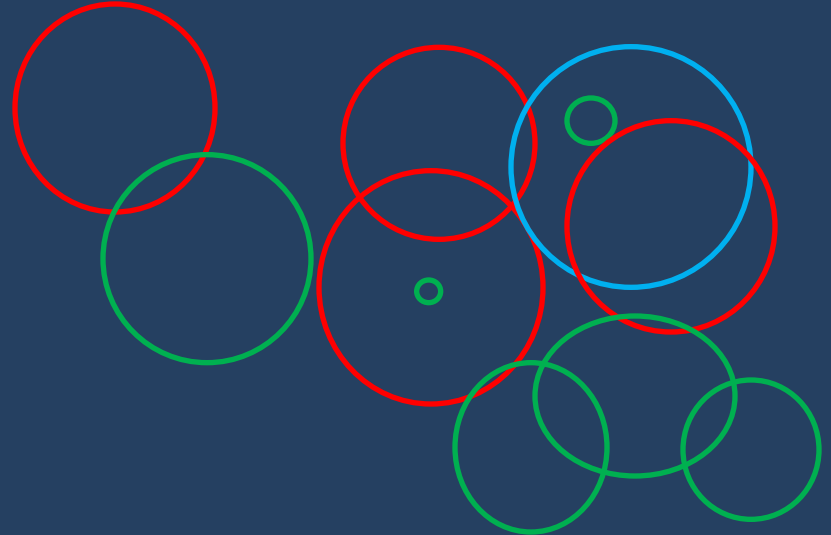
First Refusals

If a station cannot be
repacked...



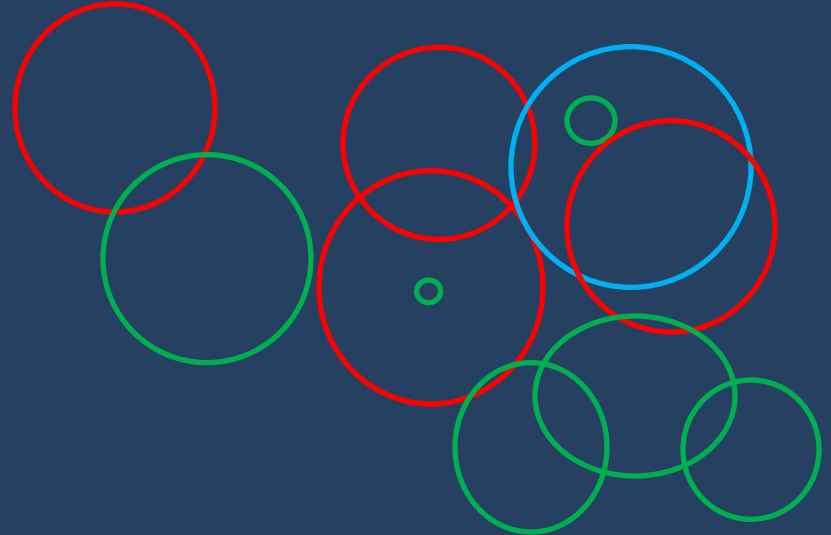
First Refusals

If a station cannot be repacked... clearing that station is critical to repacking and meeting the clearing target.



First Refusals

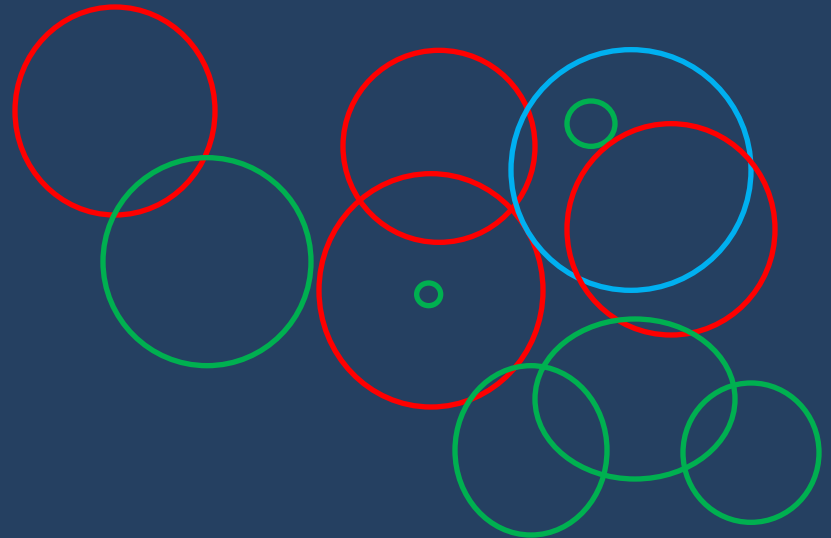
The station that
cannot be repacked
is frozen.



First Refusals

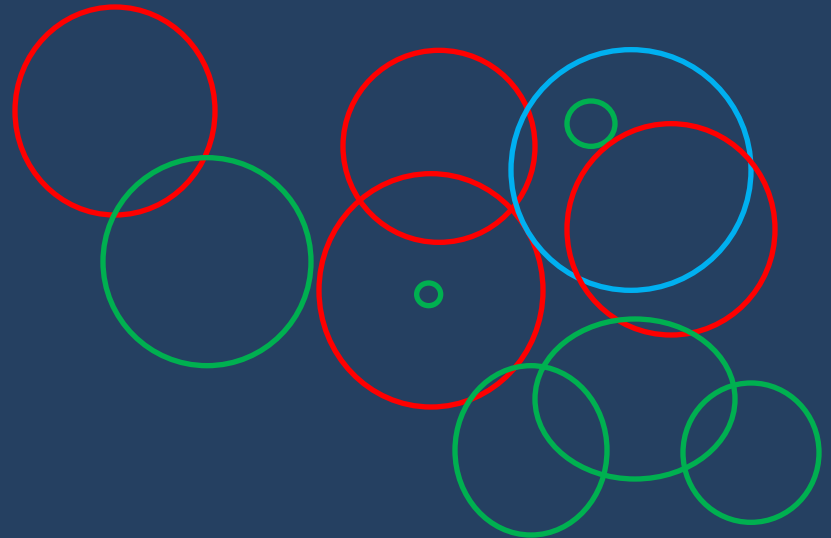
The station that
cannot be repacked
is frozen.

The FCC must pay it
the current offer.



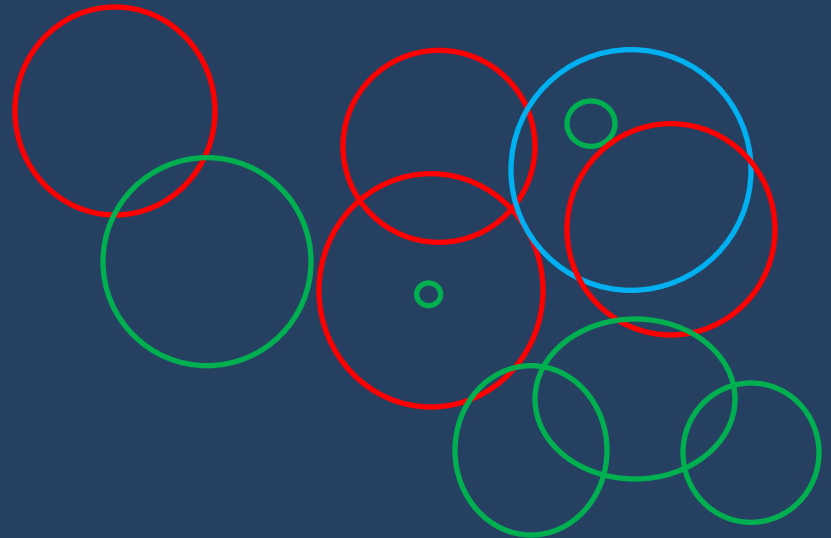
Subsequent Rounds

The FCC can repack
any of the green
stations...



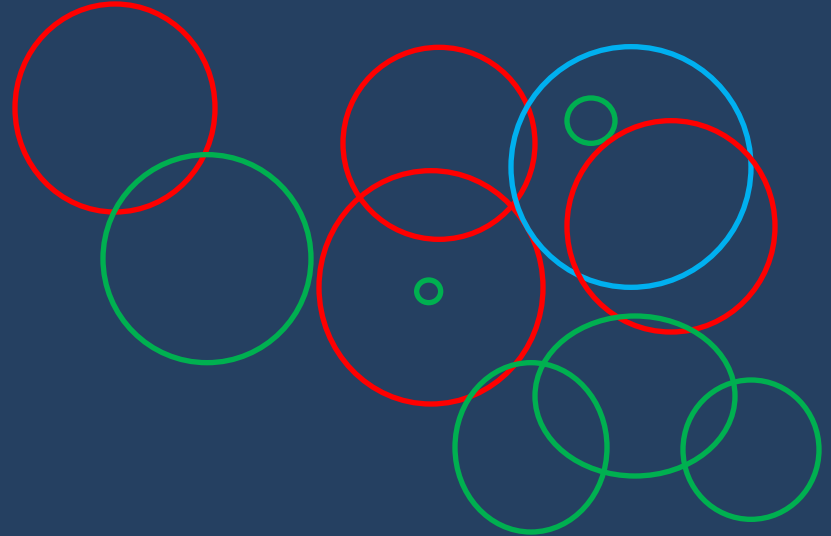
Subsequent Rounds

The FCC can repack any of the green stations... meaning they are less critical to repacking and clearing.



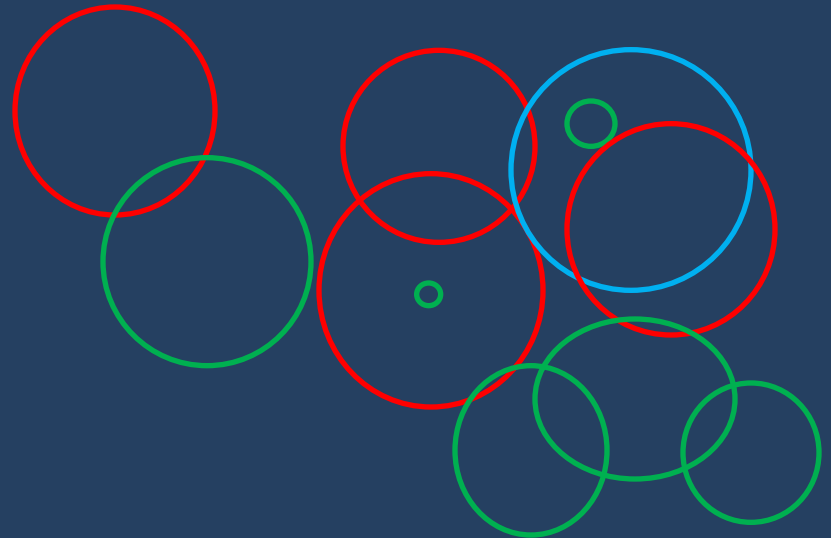
Subsequent Rounds

The FCC can offer a lower price to these stations.



Subsequent Rounds

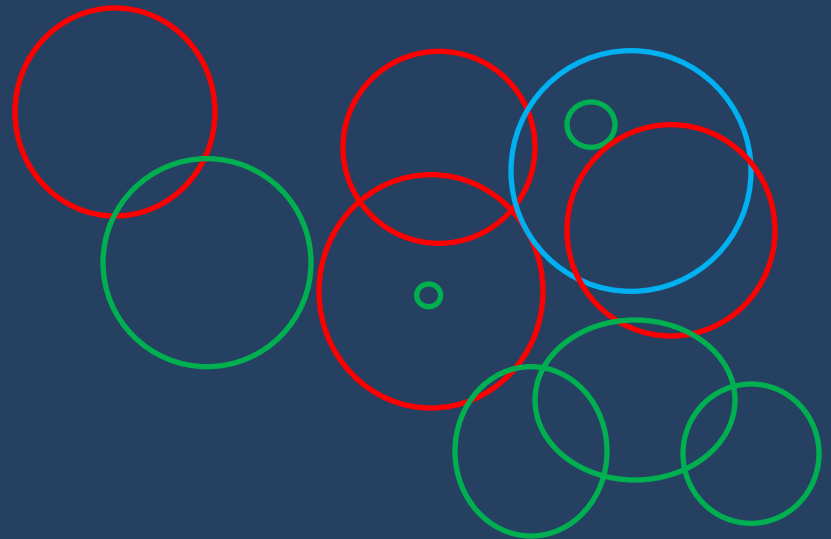
Because the FCC only has checked feasibility, not optimized, prices drop at fixed decrements.



Subsequent Rounds

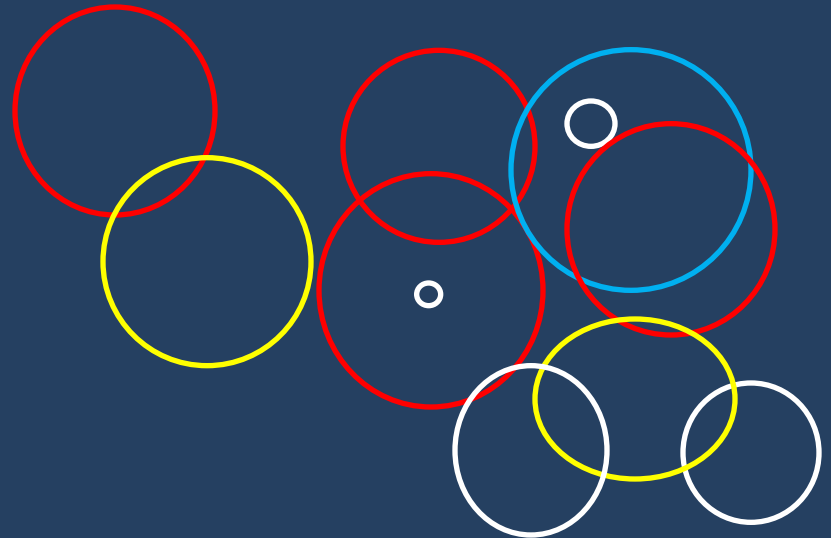
Because the FCC only has checked feasibility, not optimized, prices drop at fixed decrements.

Station A's bid and Station B's bid decrease by same percentage each round.



Subsequent Rounds

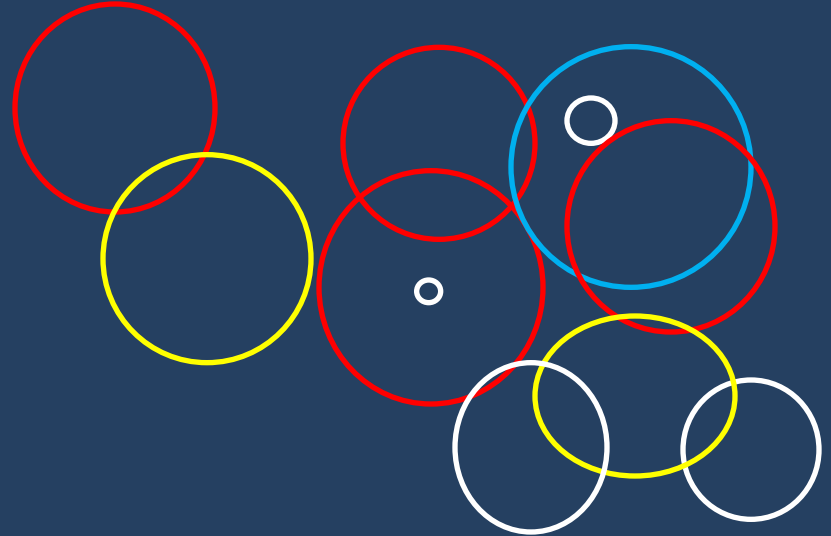
Stations (**yellow**)
may not accept the
lower offers...
...which means the
FCC must attempt to
repack them.



Subsequent Rounds

Based on the prior feasibility check, the FCC can accommodate each station individually.

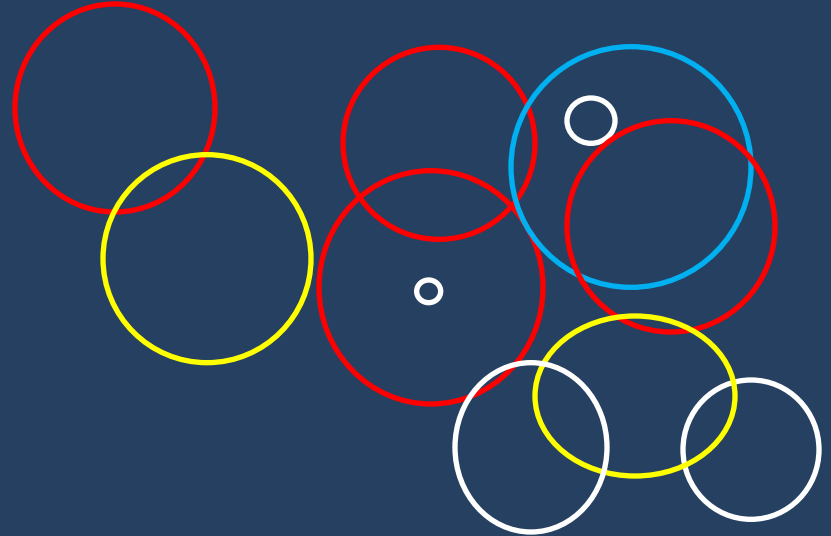
But what about both?



Subsequent Rounds

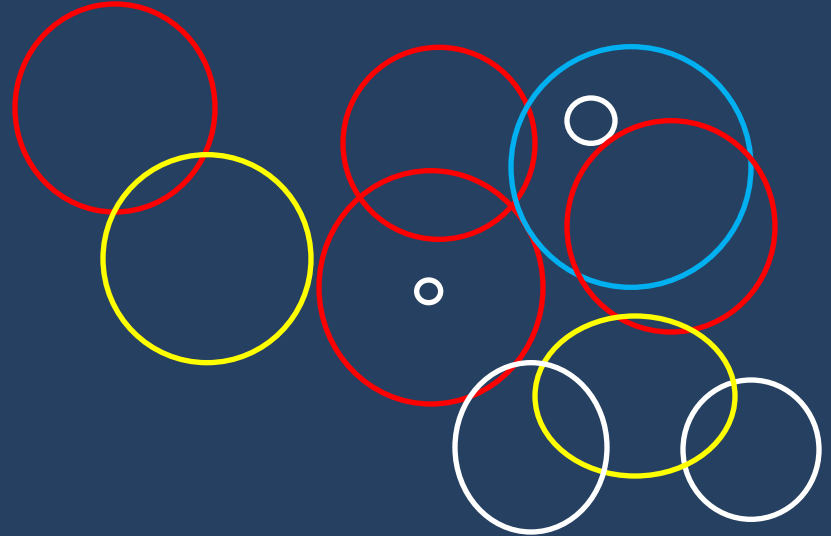
In many instances,
the FCC can
accommodate both.

If the FCC cannot,
intra-round bidding
is the “tie breaker.”



Subsequent Rounds

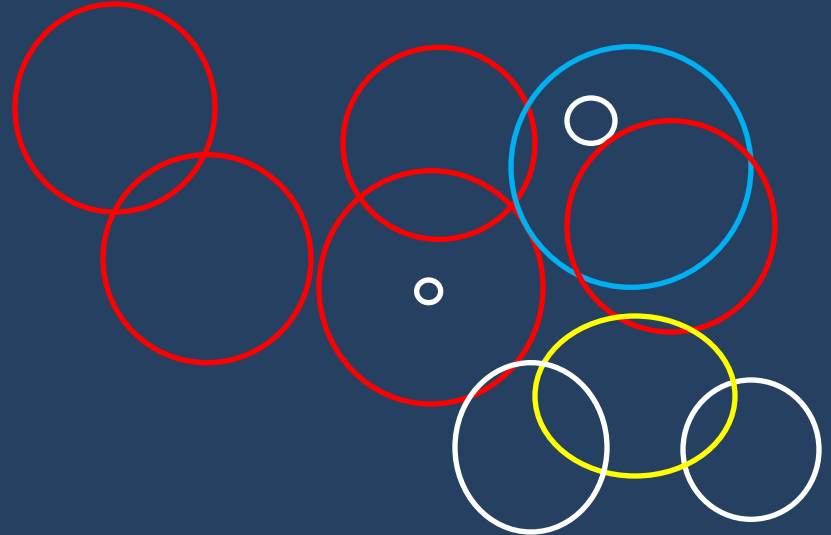
Assuming a tie-breaker resolution...



Subsequent Rounds

Assuming a tie-breaker resolution...

One station is repacked.

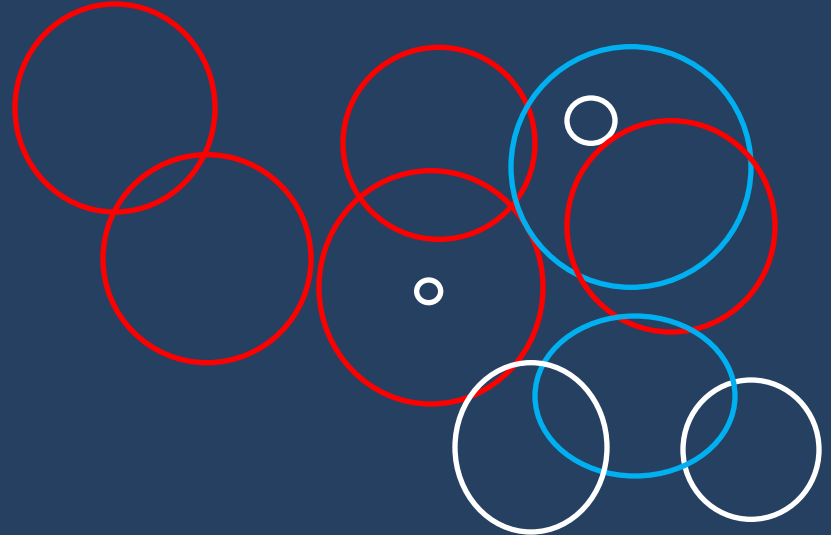


Subsequent Rounds

Assuming a tie-breaker resolution...

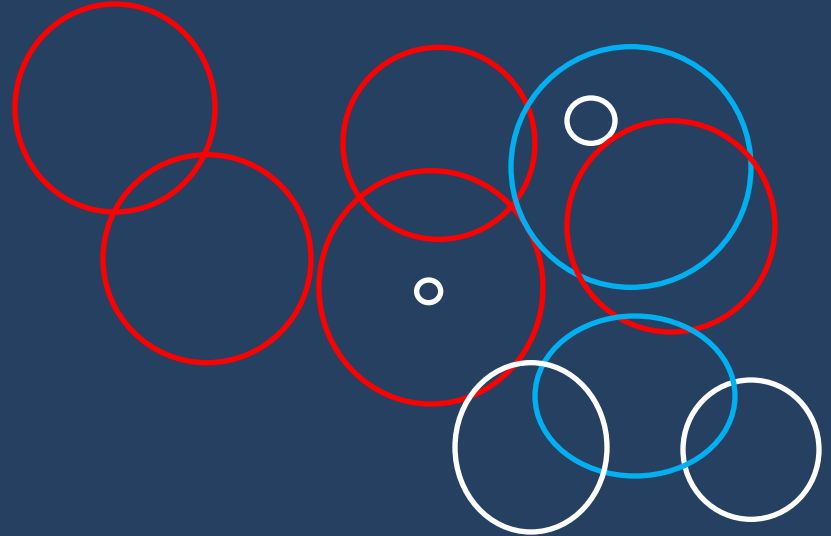
One station is repacked.

One station is frozen.



Subsequent Rounds

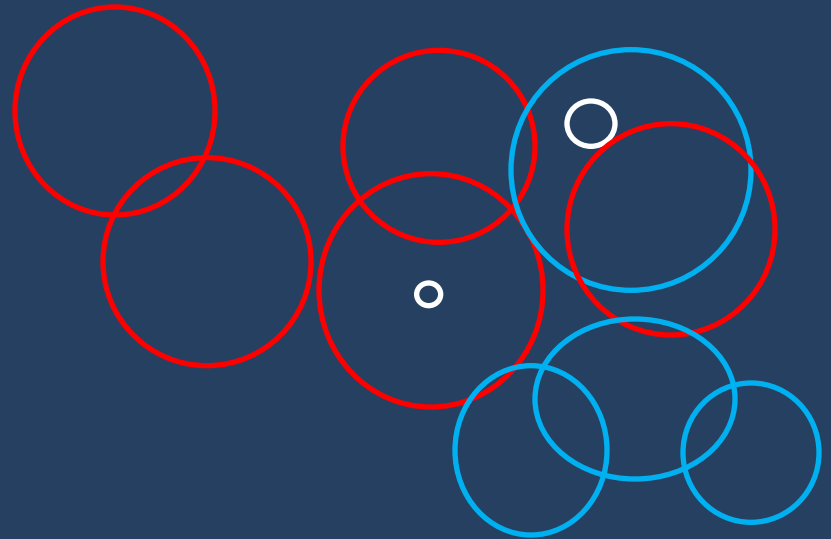
The FCC then moves
to feasibility
checking for the
remaining stations.



Subsequent Rounds

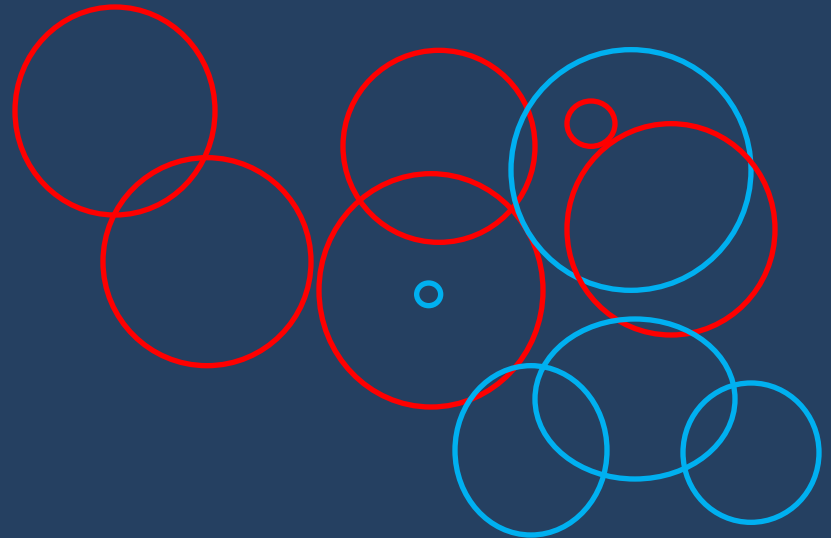
The FCC then moves
to feasibility
checking for the
remaining stations.

Which may result in
more frozen stations.



Last Round

The reverse auction
for a particular
clearing target ends
when all stations are
packed or frozen.



Post Auction

- SAT Solver guarantees there is one repacking that will work.
- Now the FCC optimizes to find the “best” channel assignment solution.
- What is “best” (*i.e.*, “define success”)?
 - Minimize disruption?
 - Minimize interference?
 - Minimize repacking costs?

Takeaway

If “scoring” is intended to adjust station prices to account for “value” in repacking, it is unnecessary.

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- The auction is designed so stations that are easy to repack go more rounds (and thus get lower offers) before being frozen.

Takeaway

If “scoring” is intended to adjust station prices to account for “value” in repacking, it is unnecessary.

- The auction is designed so stations that are easy to repack go more rounds (and thus get lower offers) before being frozen.
- Attempting to “score” applies a double financial penalty to stations that are relatively easier to repack, and may result in stations withdrawing at non-ideal times.

Takeaway

Any additional “scoring” of stations may produce less optimal results.

- If “scored” stations withdraw prematurely, FCC will pay more to clear same amount of spectrum.
- There is a risk that some stations may not participate at all if initial values do not meet expectations.